**WHAT IS CLAIMED IS:**

1. A method for determining signal parameters for one or more tones in an input signal, the method comprising:

(a) receiving samples of the input signal, wherein the input signal includes the one or more tones;

(b) operating on the samples to generate a transform array, wherein the transform array includes a positive frequency image and a negative frequency image for each of the one or more tones;

(c) identifying frequency locations of one or more first magnitude peaks in the transform array;

(d) computing a frequency estimate, amplitude estimate and phase estimate for each of the one or more tones based on complex values of the transform array in a neighborhood of a corresponding one of the frequency locations;

(e) correcting the complex values of the transform array in the frequency neighborhood of each frequency location based on the frequency estimates, amplitude estimates and phase estimates for the one or more tones;

(f) computing an improved frequency estimate, improved amplitude estimate and improved phase estimate for each of the one or more tones based on the corrected complex values in the neighborhood of the corresponding frequency location;

(g) storing the improved frequency estimates, improved amplitude estimates and improved phase estimates for the one or more tones.

2. The method of claim 1, wherein (e) comprises:

(e1) estimating, for a first tone of said one or more tones, the complex contributions of positive and negative frequency images of tones other than said first tone

based on the corresponding frequency estimates, amplitude estimates and phase estimates;

(e2) performing a plurality of summations resulting in a plurality of summation values, wherein each summation value includes one of the complex contributions for each of said positive and negative frequency images of tones other than said first tone;

(e3) subtracting the summation values from the corresponding complex values of the transform array in the frequency neighborhood of the frequency location corresponding to the first tone.

3. The method of claim 2, wherein (e) further comprises:

estimating, for the first tone, the complex contribution of the negative frequency image of the first tone based on the frequency estimate, amplitude estimate and phase estimate of the first tone;

wherein each summation further includes one of the complex contributions of the negative frequency image of the first tone.

4. The method of claim 2, wherein (e) further comprises performing (e1), (e2) and (e3) repeatedly as the first tone runs through the one or more tones.

5. The method of claim 1,

wherein one or more of the positive frequency images and negative frequency images of the one or more tones at least partially overlap.

6. The method of claim 1, wherein (e) operates to compensate the effects of the negative frequency images of the one or more tones on the complex values of the transform array in the frequency neighborhood of each frequency location.

7. The method of claim 1, wherein, for a first tone of said one or more tones, (e) operates to compensate the effects of the positive frequency images of tones other than said first tone on the complex values of the transform array in the frequency neighborhood of the frequency location corresponding to the first tone.

8. The method of claim 1, wherein said operating on the samples comprises:

applying a window function to the samples to generate a windowed input signal; and

computing a discrete Fourier transform of the windowed input signal to determine the transform array.

9. The method of claim 1, wherein (d) comprises computing the frequency estimate and amplitude estimate for each of the one or more tones based on the magnitudes of the complex values of the transform array in the neighborhood of the corresponding frequency location.

10. The method of claim 1, wherein (d) further comprises computing the phase estimate for each of the one or more tones based on the phase angle of one or more of the complex values of the transform array in the neighborhood of the corresponding frequency location.

11. The method of claim 1, wherein (f) comprises computing the improved frequency estimate and the improved amplitude estimate for each of the one or more tones based on the magnitudes of the corrected complex values in the neighborhood of the corresponding frequency location.

12. The method of claim 1, wherein (f) further comprises computing the improved phase estimate for each of the one or more tones based on the phase angle of

one or more of the corrected complex values in the neighborhood of the corresponding frequency location.

13. The method of claim 1, further comprising:

repeating (e) and (f) one or more times before performing (g);

wherein the improved frequency estimates, improved amplitude estimates and improved phase estimates from a current iteration of (f) are used as the frequency estimates, amplitude estimates and phase estimates in a next iteration of (e).

14. The method of claim 1, wherein, for a first tone of said one or more tones, (e) comprises:

(e1) computing a first shifted window value W(k,j) at a bin index value k for each negative frequency image $N_j$ based on the frequency estimate for the corresponding tone $x_j$;

(e2) multiplying each first shifted window value W(k,j) by the amplitude estimate for corresponding tone $x_j$ to generate a first product G(k,j);

(e3) phase shifting each first product G(k,j) by an angle which depends on the phase estimate of the corresponding tone $x_j$;

(e4) computing a summation value D(k), wherein the summation value D(k) includes the first product G(k,j) for each tone $x_j$ of the one or more tones;

(e5) subtracting the summation value D(k) from the corresponding complex value of the transform array in the frequency neighborhood of the frequency location corresponding to first tone.

15. The method of claim 14, wherein, for the first tone of said one or more tones, (e) further comprises:

computing a second shifted window value T(k,j) at the bin index value k, for each positive frequency image $P_j$ except the positive frequency image $P_1$ corresponding to the first tone, based on the frequency estimate for the corresponding tone $x_j$;

multiplying each second shifted window value T(k,j) by the amplitude estimate for corresponding tone $x_j$ to generate a second product G(k,j);

phase shifting each second product G(k,j) by an angle which depends on the phase estimate of the corresponding tone $x_j$;

wherein the summation value D(k) includes the second product G(k,j) for each tone $x_j$ of the one or more tones other than the first tone.

16. The method of claim 14, further comprising:

repeating (e1) through (e5) for each bin index value k in the frequency neighborhood of the frequency location corresponding to the first tone.

17. The method of claim 1, wherein (c) comprises:

determining magnitude peaks in the magnitude spectrum of the transform array which exceed a magnitude threshold in a range of positive frequencies; and

computing a center frequency for each of the threshold-exceeding magnitude peaks.

18. The method of claim 1, further comprising:

transmitting an indication of the improved frequency estimates, improved amplitude estimates and improved phase estimates for the one or more tones to an output device.

19. A system for determining signal parameters for one or more tones in an input signal, the system comprising:

an input for receiving samples of the input signal, wherein the input signal includes the one or more tones;

an output device;

a memory configured to store program instructions;

a processor configured to read the program instructions from the memory and to execute the program instructions, wherein, in response to execution of the program instructions, the processor is operable to:

(a) receive samples of the input signal, wherein the input signal includes the one or more tones;

(b) operate on the samples to generate a transform array, wherein the transform array includes a positive frequency image and a negative frequency image for each of the one or more tones;

(c) identify frequency locations of one or more first magnitude peaks in the transform array;

(d) compute a frequency estimate, amplitude estimate and phase estimate for each of the one or more tones based on complex values of the transform array in a neighborhood of a corresponding one of the frequency locations;

(e) correct the complex values of the transform array in the frequency neighborhood of each frequency location based on the frequency estimates, amplitude estimates and phase estimates for the one or more tones; and

(f) compute an improved frequency estimate, improved amplitude estimate and improved phase estimate for each of the one or more tones based on the corrected complex values in the neighborhood of the corresponding frequency location; and

(g) transmit an indication of the improved frequency estimates, improved amplitude estimates and improved phase estimates for the one or more tones to an output device.

20. The system of claim 19,

wherein one or more of the positive frequency images and negative frequency images of the one or more tones at least partially overlap.

21. The system of claim 19, wherein (e) operates to compensate the effects of the negative frequency images of the one or more tones on the complex values of the transform array in the frequency neighborhood of each frequency location.

22. The system of claim 19, wherein, for a first tone of said one or more tones, (e) operates to compensate the effects of the positive frequency images of tones other than said first tone on the complex values of the transform array in the frequency neighborhood of the frequency location corresponding to the first tone.

23. The system of claim 19, wherein, in operating on the samples, the processor is operable to:

apply a window function to the samples to generate a windowed input signal; and

compute a discrete Fourier transform of the windowed input signal to determine the transform array.

24. The system of claim 19, wherein, in response to the execution of the program instruction, the processor is operable to compute the frequency estimate and amplitude estimate for each of the one or more tones based on the magnitudes of the complex values of the transform array in the neighborhood of the corresponding frequency location.

25. The system of claim 19, wherein, in response to the execution of the program instructions, the processor is operable to compute the phase estimate for each of the one or more tones based on the phase angle of one or more of the complex values of the transform array in the neighborhood of the corresponding frequency location.

26. The system of claim 19, wherein, in response to the execution of the program instructions, the processor is operable to compute the improved frequency estimate and the improved amplitude estimate for each of the one or more tones based on the magnitudes of the corrected complex values in the neighborhood of the corresponding frequency location.

27. The system of claim 19, wherein in response to the execution of the program instructions, the processor is operable to compute the improved phase estimate for each of the one or more tones based on the phase angle of one or more of the corrected complex values in the neighborhood of the corresponding frequency location.

28. The system of claim 19, wherein the output device is a display device.

29. A method for determining signal parameters for one or more tones in an input signal, the method comprising:

(a) receiving samples of the input signal, wherein the input signal includes the one or more tones;

(b) operating on the samples to generate a transform array, wherein the transform array includes a positive frequency image and a negative frequency image for each of the one or more tones;

(c) identifying frequency locations of one or more first magnitude peaks in the transform array;

(d) computing one or more of a frequency estimate, amplitude estimate and phase estimate for each of the one or more tones based on complex values of the transform array in a neighborhood of a corresponding one of the frequency locations;

(e) correcting the complex values of the transform array in the frequency neighborhood of each frequency location based on one or more of the frequency estimates, amplitude estimates and phase estimates for the one or more tones;

(f) computing one or more of an improved frequency estimate, improved amplitude estimate and improved phase estimate for each of the one or more tones based on the corrected complex values in the neighborhood of the corresponding frequency location;

(g) storing the one or more of the improved frequency estimates, improved amplitude estimates and improved phase estimates for the one or more tones.

30. The method of claim 29, further comprising:

transmitting an indication of one or more of the improved frequency estimates, improved amplitude estimates and improved phase estimates for the one or more tones to an output device.

31. A memory medium comprising program instructions for determining signal parameters for one or more tones in an input signal, wherein the program instructions are executable by one or more processors to implement:

(a) receiving samples of the input signal, wherein the input signal includes the one or more tones;

(b) operating on the samples to generate a transform array, wherein the transform array includes a positive frequency image and a negative frequency image for each of the one or more tones;

(c) identifying frequency locations of one or more first magnitude peaks in the transform array;

(d) computing a frequency estimate, amplitude estimate and phase estimate for each of the one or more tones based on complex values of the transform array in a neighborhood of a corresponding one of the frequency locations;

(e) correcting the complex values of the transform array in the frequency neighborhood of each frequency location based on the frequency estimates, amplitude estimates and phase estimates for the one or more tones;

(f) computing an improved frequency estimate, improved amplitude estimate and improved phase estimate for each of the one or more tones based on the corrected complex values in the neighborhood of the corresponding frequency location;

(g) transmitting an indication of the improved frequency estimates, improved amplitude estimates and improved phase estimates for the one or more tones to an output device.

32. The memory medium of claim 31, wherein (e) operates to compensate the effects of the negative frequency images of the one or more tones on the complex values of the transform array in the frequency neighborhood of each frequency location.

33. The memory medium of claim 31, wherein, for a first tone of said one or more tones, (e) operates to compensate the effects of the positive frequency images of tones other than said first tone on the complex values of the transform array in the frequency neighborhood of the frequency location corresponding to the first tone.

34. The memory medium of claim 31, wherein (d) further comprises computing the phase estimate for each of the one or more tones based on the phase angle of one or more of the complex values of the transform array in the neighborhood of the corresponding frequency location.

35. The memory medium of claim 31, wherein (f) further comprises computing the improved phase estimate for each of the one or more tones based on the phase angle of one or more of the corrected complex values in the neighborhood of the corresponding frequency location.

36. The memory medium of claim 31, further comprising:

repeating (e) and (f) one or more times before performing (g);

wherein the improved frequency estimates, improved amplitude estimates and improved phase estimates from a current iteration of (f) are used as the frequency estimates, amplitude estimates and phase estimates in a next iteration of (e).

37. A method for determining signal parameters for a plurality of tones in an input signal, the method comprising:

(a) receiving samples of the input signal, wherein the input signal includes the plurality of tones;

(b) operating on the samples to generate a transform array comprising complex values;

(c) computing a frequency estimate and an amplitude estimate for each of the plurality of tones based a corresponding first magnitude peak in the magnitude spectrum of the transform array;

(d) computing a phase estimate for each of the plurality of tones based on the phase of at least one of the complex values of the transform array in a frequency neighborhood of the corresponding first magnitude peak;

(e) correcting the complex values of the transform array in the frequency neighborhood of each first magnitude peak based on the corresponding frequency estimates, amplitude estimates and phase estimates of the plurality of tones;

(f) computing an improved frequency estimate and improved amplitude estimate for each of the plurality of tones based on a corresponding second magnitude peak of the corrected complex values;

(g) computing an improved phase estimate for each of the plurality of tones based on the phase of at least one of the corrected complex values in the frequency neighborhood of the corresponding second magnitude peak;

(h) transmitting as output the improved frequency estimate, improved amplitude estimate and improved phase estimate.

38. The method of claim 37 further comprising:

repeating (e) through (g) until a convergence condition based on one or more of improved frequency estimate, improved amplitude estimate, and improved phase estimate.

39. The method of claim 38 wherein the improved frequency estimates, the improved amplitude estimates, and the improved phase estimates determined in a current iteration of (f) and (g) as used as the frequency estimates, amplitude estimates and phase estimates in a next iteration of (e).

40. The method of claim 37,

wherein the transform array comprises an additive combination of a positive frequency image and a negative frequency image corresponding to each of the plurality of tones;

wherein (e) comprises:

estimating, for a first tone, the complex contributions of positive and negative frequency images of tones other than said first tone based on the corresponding frequency estimates, amplitude estimates and phase estimates;

performing a plurality of summations resulting in a plurality of summation values, wherein each summation value includes one of the complex contributions for each of said positive and negative frequency images of tones other than said first tone;

subtracting the summation values from the corresponding complex values of the transform array in the frequency neighborhood of the first magnitude peak corresponding to the first tone.

41. The method of claim 40, wherein (e) further comprises:

estimating, for the first tone, the complex contribution of the negative frequency image of the first tone based on the frequency estimate, amplitude estimate and phase estimate of the first tone;

wherein each summation further includes one of the complex contributions of the negative frequency image of the first tone.

42. The method of claim 37, wherein said operating on the samples comprises:

applying a window function to the samples to generate a windowed input signal; and

computing a discrete Fourier transform of the windowed input signal to determine the transform array.

43. A method for determining signal parameters for a tone comprised within an input signal, the method comprising:

(a) receiving samples of the input signal;

(b) operating on the samples to generate a transform array comprising complex values;

(c) computing a frequency estimate and an amplitude estimate for the tone based a first magnitude peak in the magnitude spectrum of the transform array;

(d) computing a phase estimate for the tone based on the phase of at least one of the complex values of the transform array in a frequency neighborhood of the first magnitude peak;

(e) correcting the complex values of the transform array in the frequency neighborhood of the first magnitude peak based on the frequency estimate, amplitude estimate and phase estimate;

(f) computing an improved frequency estimate and improved amplitude estimate for the tone based on a second magnitude peak of the corrected complex values;

(g) computing an improved phase estimate for the tone based on the phase of at least one of the corrected complex values in the frequency neighborhood of the corresponding second magnitude peak;

(h) transmitting as output the improved frequency estimate, improved amplitude estimate and improved phase estimate.

44. The method of claim 43 further comprising:

repeating (e) through (g) until a convergence condition based on one or more of improved frequency estimate, improved amplitude estimate, and improved phase estimate.